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COMMUNICATIONS,

FROM

October the 1st, until the 12th of December,

1795.

PUBLISHED BY

JAMES ANDERSON, M. D. & A. M.

PHYSICIAN GENERAL.

ELLOW OF THE ROYAL SOCIETY OF EDINBURGH—OF THE AME-
RICAN PHILOSOPHICAL SOCIETY AT PHILADELPHIA—AND
MEMBER OF THE SOCIETY OF PLANTERS AT ST. HELENA.

MADRAS:

PRINTED BY BONE AND COOPER;

1795.



TO JAMES ANDERSON, Esq. P. G.

I WAS yesterday favored with your packet of eggs, which were put into the new worm-house, but not given to the man I mentioned in my last letter, as intended, on account of the monsoon being so unfavorable to the trial, that if not advantageous at the commencement, would probably produce prejudices, which might take a long time to get the better of, and most likely cause a much greater delay to a general introduction of the business, than from the present period, till after the rains, the season of the year I conceive most conducive to success.

The worms removed to the Bungalow since cleared out, got very large, and few of them sick: still I shall be obliged by some more eggs, of different dates, to enable me to let the present breed go out; the wax-cloth, &c. I return by the bearer.

BOSWALL PARKISON.

Wellout, October 3d, 1795.

TO DOCTOR JAMES ANDERSON,

YOUR favor of the 2d instant has been received, it does me much credit, I am happy that my ideas coincide with those of a mind so intelligent, and capable of distinguishing whether they are founded on just observations or not.

Notwithstanding all my exertions in clearing away Jungle, &c. for this year and half past; preparing land for the cultivation of Mulberry, Cotton, &c. even with the apparent countenance of the Honorable the Governor and Council on their waste lands; and though there is no question but that there are Cawnies 1765, as is established by record, yet I have never been able to plant a stick of any kind but what, on its coming to maturity, has been claimed by some native or other, either as *Nunja*, *Punja*, or *Manium*.

I am sorry such glaring impositions should exhaust and fatigue the strongest efforts to industry ; counteracting all labour, both of body and mind.—This will assuredly continue to be so, unless the lands are specified by those whose department may render the appropriation of them effectual.

With submission to you, and my friends, I beg to lay aside any further attempts, most chearfully giving that instruction gained from unwearied application, and experience, to whomever the concerned may authorize to superintend the Farm, for their general benefit.

Your observation, that this District was unfavorable for the undertaking, on an extended scale, has proved too true, for there are not spots of waste land, enough connected, fit for the purpose, they are so distracted from distance ; some seven miles.

I have only to add that the concerned could hardly have stumbled on a worse Maghan for the present undertaking, and was it not for the plenitude of fine water in this plantation, for it was in general a mere salt marsh, and a great deal of it still as barren as the table I write on, but for the enormous expences in manure, and dint of labour, it would scarcely have yielded a mulberry leaf ; however, we conceived that we had no time to lose, and no immediate choice ; we were therefore anxious at all events to launch out on so flattering a bottom.

A BLACKADDER.

Mulberry Plantation, at Panniwaddy, October 5th, 1795.

TO JAMES ANDERSON, Esq. P. G.

I THANK you for having been pleased to favor me with a Pamphlet, entitled “ *State of the Silk Manufacture at Vellout and Panniwaddy,*” as well as with your other Pamphlets before this :—These several Pamphlets which you have published, not for your own interest, but that of the Public, do in effect, serve as splendid signs of your philanthropy and public spirit.

In your first letter of the above-named Pamphlet, directed to the Right Honorable Lord Hobart, you say that “ it is there (in China) that Silk has ever been cultivated.” on this topic you are very right, and I am also of the same opinion with you, because the Sanscrita authors of decisive authority, which I have gone through, speak of the Chinese having made a present of *Pättā*, *Kēētā*, (the silk worm) to *Yōddhīstērā*, alias, *Dhārmārāyā*, the eldest son of *Pāundōō*, during his reign at *Endraprastā*,

Endraprestā, now called *Tanausir*: moreover the Tamilian Grammars, both ancient and modern, speak of the Silk Manufacture having taken its origin from the Kingdom of China, which in the Sanscrita Language is called *Chēēnā*, and in the Tamil, *Chēēnām*, witness *Mahon*, *Bhauratam* and other sacred authors, written in the Sanscrita Tongue, as also the most ancient, and eminent grammar of the poetic Tamil, entitled *Tālcāppiam*, and also the commentaries on it.

TEROOVERCAUDOO MOOTIAH.

Nellore Fort, October 11th, 1795.

TO T. MOOTIAH MOODELLIER,

I AM favored with your letter of the 11th instant, which is very interesting, as it alludes to the introduction of the Manufacture of Silk in Hindoostan, near 5000 years ago, a work I am only endeavouring to extend at present.

As you quote the Mahabarut in evidence, I beg leave to observe that I have read the translation of the *Ghēétā*, by Wilkins, but do not recollect any thing being mentioned therein, regarding China.

You will, therefore, oblige me much by telling me in what species or particular History of Bharut the circumstance regarding so valuable a present from China, may be found.

JAMES ANDERSON.

Fort St. George, October 15th, 1795.

Extract of a letter from MR. PARKISON, to DOCTOR BERRY, dated October 14th, 1795.

“ I HAVE the pleasure to acquaint you that the Bengal Surdar allows my cocoons to be now as good as those from the Annual Worm, and I shall be glad if you will be so good as mention this to Doctor Anderson.”

TO DOCTOR JAMES ANDERSON, P. G.

I AM this instant favored with your *Miscellaneous Communications*, and do not defer a single moment offering in return my most sincere thanks.

I had in view some time since of taking the liberty to address you on the subject of Cochineal and Silk Worms, but have been prevented at first by a slight, and of late by a very violent attack of the Hill Fever, which has kept me rather long totally unfit for any business, and this is only the first day I have attempted to write something.

Give me now leave to lay before you briefly the state of these two subjects here.

Doctor Roxburgh was so kind as to send me some hundred Joints of Cactus, with these I found growing in one of the villages near Samulcottah (which I believe is the true species), I have established three different plantations in the Company's Pepper Plantation, one in a Mulberry and Nopal plantation close to Samulcottah and one at my own garden in Doctor Roxburgh's Farm, which are all now in some degree of forwardness.

As soon as the state of my health allows it, I will also transplant some large plants into one of them, and then apply for some insects: it is a pity that hereabout this plant is so exceedingly rare! else the Natives might be brought to attend to this branch of culture easy enough, as it seem lucrative, and not laborious.

The distribution of Plants in the Circars is what requires to be at present chiefly attended to; I will persuade all those natives, who have received this year Jack and Cocoa nut plants, (of the former from four to six thousand have been distributed) to take an equal number of Cactus into their gardens, and myself will disseminate as many as possible, and in the Corconda district, every village shall have a Plantation, as soon as plants enough can be procured.

There are under my charge now no less than four different Mulberry Plantations, (one at Corconda, of a fine extent, established at my own expence), which are all in a thriving state, and would nourish a great quantity of insects, which will give me pleasure to exert myself on to gain experience, if you would be so kind as to provide me with eggs.

Wishing you the best health and happiness, I have the honor to remain, with much respect,

BENJAMIN HEYNE.

Samulcotta, October 5th, 1795.

To JOHN GLASS, Esq.

At Boglipore,

AS I imagine this must be a favorable time for putting the seeds of trees in the ground with you, being about the season of
the

the rains leaving Bengal, I inclose some seeds of the Bastard Cedar, as you desired.

Many thanks for the Arnotta Seeds you were so good to send me sometime ago, which I likewise wait till after the monsoon before they are put into the earth, as I intend, for although we have some of the Plants on the coast they are not very common.

Sincerely wishing you health,

JAMES ANDERSON.

Fort St. George, October 16th, 1795.

~~FORWARDED BY THE~~

TO MR. HEYNE,

At Samulcottah,

I AM favored with your letter of the 5th instant, and have the pleasure to acquaint you, that Doctor Berry sent an Opuntia Plant, with Cochineal Insects for you, by Mr. Dela Rande, who left this ten days ago, but in case any accident prevents your receiving them, Mr. Alexander Anderson can supply you from Masulipatam.

Mr. Friman at that place, can likewise furnish eggs of both the white and yellow China monthly Silk Worm, and therefore recommend your opening a correspondence with both these Gentlemen, who will readily supply every thing you want, to begin the culture of both these insects, for although Mr. Berry sent you a dozen baskets of Opuntia likewise, by Mr. Dela Rande, Mr. Scott assures me, there are abundance more in his garden at Masulipatam, with which you may be furnished.

I enclose you some fresh seeds of the Bastard Cedar, a tree that will prove very favorable for feeding Cattle on the Farm, and heartily wishing you success.

JAMES ANDERSON.

Fort St. George, October 16th, 1795.

~~FORWARDED BY THE~~

TO JAMES ANDERSON, Esq.

I HOPE you will excuse my not acknowledging the receipt of your two publications before this time, but I assure you that business has been the occasion of it, as I have been of late at work every day, making out some calculations regarding the cultivation and manufacturing of the Sugar Cane, and the expence attending in the West Indies, and comparing them with some made by the

the natives here, which seem to agree pretty well; I am in the greatest hopes, that it will be soon set forward in the Baramahl.

I am heartily sorry to inform you of the ill success I have had with the Cochineal Insects, owing to there being no proper plants for putting them on, and was obliged to put them on a fence, where they were all devoured by ants and other insects.—In opening several of the bags, after they had been put ten days, I found in three of them a small black Spider, which I believe was a greater enemy than the ants, but having now three acres of nopal planted in the old Fort here, and all coming on very well, I must request the favor of you and Doctor Berry, for another supply that we may be able to give them another trial; but if you should think that the weather is too cool to begin just now, you can avoid sending them until a better season.

I will be likewise much obliged to you for some Cotton, Guinea Grass, and garden seeds, or indeed any kind of seed, that you may think worth the trouble of cultivation, as I expect very soon to be settled at a new village called *Cullianumputt*, where Captain Read thinks of establishing a Sugar Manufactory, to encourage Ryots to cultivate the cane, and purchase the cane from them to manufacture, which I think, is the best method, for a new beginner; for should it fail, he is only at half the loss, he would be, if he cultivated the cane himself; we shall likewise try the Mulberry and Silk Worm, which when we begin; I must intrude on your goodness for some Eggs, &c.

EYRE W. LYTE.

Trippatore, October 13th, 1795.

TO MR. LYTE,

At Trippatore,

I AM favored with your letter of the 13th, and happy at the prospect you mention of Sugar: the loss of the few Cochineal Insects is of no consequence, as Doctor Berry will take care to supply you from time to time, till they are established.

Enclosed I send you a few seeds of the Bastard Cedar, and Mauritius Cotton, and will request Mr. Porcher, to send Captain Read a large quantity of the latter, the former by the month of March, shall be forwarded in quantity sufficient to stock the whole Baramahl.

In this packet is likewise a little Guinea Grass Seeds, other seeds I have none, our Ships having been unable to procure garden seeds this year, at the Cape.

Heartily wishing you success,

JAMES ANDERSON.

Fort St. George, October 17th, 1795.

TO DOCTOR ANDERSON, P. G.

ACCORDING to the instructions which I received from you, in your last very kind letter, I planted a peice of ground with the Country Nopal, and upon acquainting Doctor Berry that I had done so, he has been so kind as to forward me a plant, covered with a number of the Cochineal Insects, which I hope to be able to give you a favorable account of on some future day, as yet only two have produced young, but I except to see many more soon.

I take the liberty of sending you a little Indigo, part of the produce of some plants which I have reared, no doubt but that you have seen a great deal manufactured in this simple manner.

SAMUEL MAC MORRIS.

Salim, September 30th, 1795.

TO JAMES ANDERSON, Esq. P. G.

AS I wish to plant such parts of the Hill Fort, where the soil is deep enough, with the Bastard Cedar Tree, you will very much oblige me, by sending me a little fresh seed, as I have sown it three different times with seed I got from Mr. Wynch, but only six plants have come up.

From the airy situation of the Hill Fort with plenty of water, and their being no cattle admitted within the walls, I have not the least doubt of its thriving remarkably well, and in the event of a siege, proving very beneficial to the Garrison.

J. CUPPAGE.

Dindigul, October 12th, 1795.

TO LIEUTENANT COLONEL CUPPAGE,

Commanding Dindigul,

I SEND you in this enclosure some Bastard Cedar Seeds, agreeable to your desire, fresh gathered from the trees, every one
of

of which at this moist season, will no doubt come up, and heartily wishing success to your laudable intentions of storing the garrison with timber and forage.

JAMES ANDERSON.

Fort St. George, October 17th, 1795.

TO JAMES ANDERSON, Esq. P. G.

I HAVE had the honor to receive the Book which your honor has been pleased to send me, and have perused the contents with the greatest pleasure, and assure your honor that such work has never been done hitherto on this Coast, I mean to have it translated into Persian, to send to my friends at different places.

I have prepared two large and remarkable gardens for the above purpose, in one of which I propose to cultivate Silk, and in the other Cochineal, and hope in God, that in a very short time, I may have it in my power to have the gardens in a complete state.

By a letter of my brother, Meer Mahomed Jaffier Ally Cawn, I understand that your honor had written to Mr. Friman on the subject of Mulberry Plants, to whom I applied for them; but he said he had not received any letter from you for that purpose.

CUTTUB MULK.

Masulipatam, October 10th, 1795.

TO LIEUTENANT FRIMAN,

At Masuliapatam,

BY a letter which I have just received from Mobarik à Dowla Cuttub Mulk, son of Hassan Ally Cuttub à Dowla, late Nabob of the Circars, I understand that he has a desire to cultivate silk, in which case you will oblige me very much by supplying him with what Mulberry cuttings you can spare to begin planting his garden, which you may acquaint him may be completed by a farther supply from Ellore, Condapilly and Guntoor.

JAMES ANDERSON.

Fort St. George, October 17th, 1795.

TO DOCTOR ANDERSON, P. G.

I WAS favored a few days ago with your last publication, and beg you to accept my best thanks for your obliging attention. I have read those letters with a great deal of pleasure, and am very happy to observe from them, that the Cochineal Insect thrives so well, and that every appearance hitherto promises success to your benevolent undertaking.

I have thus long delayed to acknowledge the receipt of your publication, for the purpose of troubling you with some remarks on the temperature of India, which I now beg to submit to your opinion and better informed experience.

It is rather a long story, and I am afraid the perusal will fatigue your patience. I would wish, if I can find materials to effect it, to trace the variations of the climate, in their connection with the diseases of India.

What I have now taken the liberty of troubling you with are only some observations, respecting the southern and maritime parts of this Peninsula.

FRA. DUNCAN.

Warriore, October 2d, 1795.

Observations on the temperature of some parts of the Peninsula of India, and on the medium heat of the Coast of Coromandel.

For the purpose of ascertaining the mean temperature of India, it would be necessary to compare the result of observations made in various and distant situations of the country. I am not in possession of materials sufficient to enable me to determine so general a question. What I have to say only respects the temperature of the southern parts of the Peninsula, and the mean heat of the Coast of Coromandel.

The distinguishing characteristic of this climate, is its uniformity of temperature, which in the open parts of the Coast, is never subject, to any sudden or violent changes. It appears from a register kept at Madras, by Mr. Chamier, during four successive years, that the heat at the same hour, same day and the same month of each year, varied but little. That the difference of temperature between morning, noon, and midnight, was often not more than 2 or 3 degrees; was generally about 6 or 7, and hardly ever exceeded 10. That the mean range of the Thermometer from the one year's end to the other, was confined within the limits of 25 degrees; and that even taking into account the unusual heats and

colds of particular seasons, the whole scale of Temperature from it's most opposite extremes exceeded not 36 degrees; viz. from 64 to 100, which Mr. Chamier only observed once in the course of 4 years. But the extremes of heat and cold only occupy an inconsiderable portion of the year, and the inhabitant of Madras passes four fifths of his time in a temperature that is above 76 and below 90.

This uniform Temperature which prevails at Madras and many other places on the coast, is in a great measure to be ascribed to the vicinity and influence of the ocean. But when we go into the interior parts of the country, where this influence is not felt, we meet with a greater variety of climate, and with more intense extremes of heat and cold, whose duration and sudden transitions are variously modified by the surrounding circumstances of the situation: By the lowness or elevation of the country; by its being mountainous or woody, barren or cultivated; by the prevalence of the Inland-winds, and the state of the country over which they blow; and, finally, by the abundance or scantiness of the rains.

On the table-land of Mysore, at the distance of 150 miles from Madras, and in the same parallel of latitude, the thermometer at sun rise during November, December, January, and February, is found to sink 15 degrees below the Temperature of the chilliest morning in the plains of the Carnatic: and in the woody country about *Shevandroog*, a person suffers a greater change of temperature in the course of 12 hours than he would experience at Madras, during the revolution of as many years.

In open and bleak plains where the reflexion from the parched surface, co-operates with the direct rays of the sun, the heat becomes extremely intense. At Arcot, in the least exposed shade, the Thermometer has been found for many days together, to rise to the height of 105. In such situations too, when accidental rains do not interrupt the settled uniformity of the weather, the temperature suffers but little abatement during night and morning. At Poonamallee, during part of April and May, 1793, the Thermometer never fell lower than 89, and always rose above 96, often to 98 and sometimes to 103. But this was an unusually hot season, and no rain had fallen for nearly six months.

During long continued rains, as well as in a course of fair and settled weather, the opposite extremes of heat and cold are continually approximating. During the Malabar Monsoon of 1789 and 1790, the Temperature for several months was between 74 and 82, and during great part of that time seldom rose 2 degrees

degrees above 78, or fell 2 degrees below it. But here the rains were very heavy; the sun sometimes entirely hid for weeks together, and the earth overshadowed with a gloom and obscurity, resembling the darkest December day in London: a curious circumstance to occur under a vertical sun, at mid-day, and within ten degrees of the line!

The state of cultivation has great influence on the Temperature. In the neighbourhood of Trichinopoly, where the lands are annually overflowed by the freshes of the Caverry, the Temperature is more uniform and moderate than in the southern districts, where the rains are more scanty, and where the inclemency of the seasons so frequently affects the growth of the harvests. At Palamcottah, during the month of January, the Thermometer has been found to vary from 75 to 89, which is far above the heat of Madras and Trichinopoly at the same period.

In plains surrounded with hills, it may be naturally expected that the sun will be felt very powerful. In the valley of Ambore, during the months of March April and May, there prevails an intense and sultry heat, which raises the Thermometer under the shade of a *Markée* to 110 and 112 degrees. But here as well as at Trichinopoly, the land-winds setting in during May or June, mitigate the climate by blowing over a cultivated country, and bringing with them a constant succession of hazy or cloudy weather.

It is in the Northern Circars, where the westerly winds in their progress, are exposed to the influence of more extensive and parched lands, that the severest heats prevail, and which at Ellore have sometimes raised the Thermometer in the shade to the astonishing height of 120 degrees: when this happens, there is always a considerable mortality, which I am rather inclined to impute to the peculiar malignity of the winds, than to the degree of actual existing heat. For in the Carnatic, during the hot months, every person who exposes himself without doors at noon, suffers a much greater degree of heat; and the Thermometer in this situation rises to 136 degrees, sometimes higher. Yet this Temperature is not only compatible with life, but even with the active functions of men. For in the midst of it, armies march with all their cumbrous equipments. Forts are erected and demolished, and a heat that rises 60 degrees above the summer-Temperature of the British Islands, is unable to restrain the efforts of men engaged in war, commerce, or amusement.

In India the circumstances of the subjacent country seem to have a stronger influence on the state of the circumambient atmosphere

atmosphere than is observed to take place in cold and temperate climates; for we often find clear and foggy skies; dry and rainy weather: and a salubrious and malignant air only separated by the distance of a very few miles.

I have observed that the Temperature is much influenced by the abundance or scantiness of the rains of particular seasons, and this is perhaps the chief cause, why one year happens to be cooler or hotter than another in the same place. The season of 1795, has been much cooler at Warriore than that of 1794, and the former was preceded by a heavier monsoon and of longer duration than the latter, which made a difference of Temperature during March, April, and May. (the hottest months here) of 3 Degrees: a difference which we feel very sensibly in a high Temperature, where the smallest increase beyond what we can easily bear, very sensibly affects us. I ascribe this to the effects of a more luxuriant vegetation, which is always proportionate to the abundance of the rains.

In order to form a correct estimate of the medium-heat of the Coromandel Coast, we must examine it abstractedly from the agency of hot winds, accidental storms and the effects of reflexion from a parched surface; and our observations must be made remote from those circumstances of situation, which are known to encrease the extremes of heat and cold. To mark the lowest point to which the mercury sinks, and the highest to which it rises, is not the object here in question; but to ascertain that *central-point* of Temperature, near which it settles the greater part of the year, to which it is constantly tending amid all its fluctuations; and to which it necessarily returns in a contrary progress, more or less accelerated, from its widest departures into the opposite extremes of heat and cold. It seems clear that the middle point between these extremes cannot be assumed as the *mean Temperature*; for the Mercury falls but very seldom to its lowest degree of cold and remains there only a little time; whereas during nine months in the year, it is continually verging towards the limits of excessive heat, and though it sinks but seldom under 70, it often rises above 90.

With the exception of some extraordinary seasons, it is seldom that the Thermometer either sinks below 68 or rises above 96, and only a few times in the year, (and not every year) that it reaches those extremes: perhaps during some cool mornings occurring in December and January, and a few intensely hot afternoons, generally between the middle of April and the middle of June. The influence of the westerly winds, and of heavy dews and chill damps in some parts of the country, may for

a little while extend the range of the Thermometer 20 degrees beyond what I have mentioned, viz. by raising it 10 degrees above 96 at one period of the year, and sinking it 10 degrees below 68 at another, and more considerable deviations from the ordinary standard, have sometimes occurred. But these extraordinary extremes of heat and cold, happen not in every situation, nor every year, and when they do happen, they only occupy a portion of time incomparably small. For it will be found that in 300 days and nights, out of 365, the Thermometer is seldom below 76 and seldom above 92, and that somewhat more than four-sixths of our time in this country, are passed in a Temperature that lies between 77 and 89, and that its deviations above and below these limits, at the opposite periods of the year, will nearly balance each other. Now as during three fourths of the year, the Temperature approaches much nearer to 89 than it does to 77, it seems probable that a point distant 3 degrees from the former and 9 degrees from the latter, that is 86, ought to come the nearest to the medium of the heat of the Coast of Coromandel. This, I consider, as approaching nearest to the Temperature most generally predominating in the atmosphere, abstracted from the influence of land winds, heavy dews; the reverberation of light from a heated surface, the monsoon rains, and accidental storms.

So far I was satisfied to reason on this matter, assisted by the comparison of various observations and registers of the weather made in different parts of the country in the course of between 7 and 8 years. These I diligently compared with the diaries of Mr. Chamier, and became more convinced that the medium heat of this coast must be about 86, and it was not a little satisfactory to me to find at last, that these deductions came pretty near the truth.

Desirous to bring the matter to the test of experiment, I determined to ascertain the Temperature of deep-seated springs, as has been done in Europe, though I do not know that any thing of the kind has ever been tried within the Tropics. For this purpose, I chose a well at Warriore, 27 feet deep, and perfectly shaded by trees from the rays of the sun. On immersing the Thermometer in the water of this well, the mercury settled at a quarter of a degree below 86. I have repeated the experiment for the last two months, morning, noon, and evening, and invariably with the same result. This I cannot help considering as fair and conclusive, so far as Experiment made in one situation *only*, can be allowed to have weight in determining a general Question. I have no doubt but that springs in mountainous situations will be found somewhat colder,

colder, and that those nearer the sea may also vary a little. This would be worth ascertaining. I own it is rather a matter of curious speculation than of real utility. People will hardly think of building for themselves subterraneous abodes, for the purpose of taking refuge from excessive heat: Yet it is certainly a matter of curiosity to know, that at the distance of 27 feet below the surface of the earth there prevails a temperature that never varies.

From the result of the above experiments and observations, compared with those that have been made at home, it appears that the Medium heat of this part of India rises 40 degrees above the middle Temperature of the British Islands.

October 1st, 1795.

P. S. It should have been noticed that the spring where the above observations were made, is drained twice a day for the purposes of culture, so that the water never stagnates, and it is not accessible to the rays of the sun. In taking the observation a good deal of accuracy was necessary, for the Thermometer on being drawn from the water, became instantly affected by the power of evaporation, and the Mercury fell suddenly several degrees: tho' in the water it stood invariably at the same point.

I ought likewise to observe, that in a house near the well where the experiments were made, the range of the Thermometer for the two months was from 78 to 90. It only fell to 78 a very few mornings. The middle point between these extremes is 84. But it would be a fallacy to consider 84, as the mean temperature of the air during the above period. For from 9 in the morning till 7 in the evening, the thermometer was above 84; seldom fell below it, before 12 at night, and only a little before sun rise for a few mornings sunk to 78. It seems evident that the atmosphere around us, independent of accidental influences, must be continually tending towards the temperature in the bowels of the earth, which acts with an invariable steadiness and uniformity.

TO JOHN CHAMIER, Esq.

YOU will oblige me by looking over the enclosed Meteorological Memoir, and making such remarks as your knowledge of the subject suggests.

JAMES ANDERSON.

Fort St. George, October 18th, 1795.

To

TO JAMES ANDERSON, Esq. P. G.

I TAKE the liberty of enclosing you an extract of a letter from an ingenious correspondent at Calcutta, dated 18th September, 1795, and beg of you to forward him the information requested.

WILLIAM DRING.

Madras, October 18th, 1795.

“ I have made a small trial in the new branch, of planting the Cochineal, and had but nine worms to put on some plants I had in pots, which I kept under a shade during the rains. These are multiplied very fast and I have now 100 plants full of insects which will breed in the course of one month, and I have collected two ounces of cochineal all in the course of three months; now as soon as the fair weather sets in, will carry them out and put the insects on plants in the open air.

This I really believe will become a branch of business very considerable in Bengal, but I believe the climate on the Coast better, being more dry.

Raynal and the French Encyclopedia, say, that they breed every two months, in the Brazils and in the Spanish Colonies, and I find they breed here in less than one, so that it would make up for the worse climate; but they are smaller in this country than the Spanish ones, and I believe but the second quality; I am confident that a man in the country entirely attending to it would make it answer very well.

It is a pity that the first quality of insects are not to be had, because they would certainly thrive, and the prickly pear, or nopal, is to be had in every jungle for nothing, and grows very easy every where.

I suppose you are informed that this insect, was brought out by a Ship that touched at the Brazils last season. I wish you would favor me by enquiry from Doctor Anderson at Madras, if those he has are the same, and if they seem to get any perfection, and how long they are before they breed, and should his be of another kind, I would esteem it a very great favor to get me a female one on a plant.”

TO JAMES ANDERSON, Esq. P. G.

I HAVE read with much attention the observations you have sent me regarding the climate of the Coast, and can truly say that they correspond entirely with those I have made during my residence

residence in India. the medium heat appears to be justly placed at 86° although I believe it might be fixed with propriety two degrees lower at some places north of the Kistna, such as *Samaldiva*, *Waltaire*, and *Ganjam*.

Although I did not keep a regular diary, I constantly during three years (1792, 1793, and 1794,) observed the state of the thermometer at *Waltaire*, which on a comparison with the diary kept at *Madras*, was always two or three degrees lower; in December I have seen it at 60° , and in June at 95° but never higher, and then only for three or four hours.

At *Ganjam*, I have seen the thermometer exposed to a northern aspect stand at 55° , this was in the latter end of December 1792, and in January 1793, I saw the thermometer, in a room at *Balasure* so low as 50° it rose in the middle of the same day to 65° .

At *Sankerry-droog* and *Ryacotta* in August last, I observed the thermometer at sun-rise, when it stood at 72 , 73 , and 74° at the same period at *Madras*, it was about 86° .

The result of all the observations is, that we enjoy a fine salubrious climate on the Coast.

JOHN CHAMIER.

Madras, October 19th, 1795.

TO JAMES ANDERSON, Esq. P. G.

AFTER hoping that these few lines will find you well, I take this speedy opportunity of acquainting you that the insects I so seemingly gave over in my last, on account of the weather, after being tied to the trees nineteen days, at length have made their appearance very thick.

Our having had very heavy rains on the first 5 days after they were tied to the trees, led me to think the spider went into the bag rather for a shelter than any thing else.

A part of them had a shade over them, and the other part not, which induces me now to believe that the erecting of pandalls is needless, as I see no difference in the having them sheltered or not in regard to their encrease.

Captain Read's time, being much taken up in other business, he has just desired me to present his compliments to you, and requests you will be so good as send, besides what I wrote you for

in

in my last, some of the best cuttings of the Mulberry, seeds of black Pepper, and any other seeds you would wish to bring forward in this country; and that if you have not as yet despatched any, that you may dispense with sending the Cochineal Insects, as it is thought, there will be sufficient here for us to proceed.

ERYE W. LYTE,

Trippatore, October 20th, 1795.

TO SIR JOHN SINCLAIR, BART.

President of the Board of Agriculture, London.

HAVING distributed some hundred copies of your *Queries*, about the middle of last month, I was in hopes that Answers might have followed, but no answers appearing from any quarter, and the packet by the Ship Mary being to close this evening, I have written what occurred on the instant, and enclose it for your satisfaction, till such time as you may be informed by higher, and perhaps better authority, as you know that my opportunities in this way must be very limited.

JAMES ANDERSON.

Fort St. George, October 25th, 1795.

Answers to some Queries of the Board of Agriculture.

Answer 1st.—A stiff clay; but in different parts of the country there are all sorts of soils.

2d.—The occupied lands in the country are by villages, which are small communities.

3d.—The land is employed by the villages in both pasture and husbandry, in the proportion generally that appears in the Cowle of the Maghan of Pooroor, the present population being only equal to the cultivation of two thirds of the land that was under crop, in 1780.

4th.—No grasses are cultivated—The stock is chiefly Buffaloes, and a small breed of cattle for the plough, some hairy sheep, and goats, all of which may be greatly improved by better breeds from other countries.

5th.—All the rice grounds are watered, which is the most valuable crop, and as far as the population and stock extend, these are therefore cultivated; but it will appear from survey, that much may yet be done, in further watering the country.

6th.—In the watered lands rice, in the higher lands what are called dry grains, of which *Holcus*, *Sorghum*, *Cynofurus*, *Corocanus*, *Sesamum*, and various kinds of *Phaseoli*, and *Dolichos* are the principal.

7th.—A rotation of crops is unnecessary, as the lands here, are never exhausted as in Europe, but I do not know that green crops, such as Turnips or Clover have ever been cultivated for feeding cattle.

8th.—Fallowing and frequent ploughings are esteemed of great use, and universally practised, as soon as the earth is a little softened by rain.

9th.—The mixture of soils, such as sand with clay, or clay on sandy soils is perhaps the greatest improvement, and the country people are acquainted with the use of mud, that settles in the bottom of Tanks, on their light soils, but neglect the dung-hills made by the litter of their cattle, and the ashes of their fires.

10th.—A plough of the most simple construction is used, where one man both holds and drives, the harrow is a branch of the nearest tree, or a bundle of brushwood.

11th.—Oxen and Buffaloes only are used, no horses are employed in agriculture.

12th.—The setting in of the rains in October is the time of transplanting the great crop of rice from seed-beds, which is reaped in January or February.

13th.—The land is open Field.

14th.—No experiments have been made, but in all the dry grain countries, there can be no doubt, that enclosures would prove highly advantageous.

15th. and 16th.—Answered by the foregoing.

17th.—The waste lands are common fields of the village, in the records of which they are so specified, and in the neighbourhood of which they are situated.

18th.—Extensive tracts over-run with shrubs, the site of villages depopulated by the war of 1780, are only inhabited by wild beasts.

19th.—Where water and labourers can be found, the waste lands are capable of the same productions as other lands, which might in general be effected by the establishment of hereditary property, in the lands, to individuals.

20th.—

20th.—Three fanams for a man and two for a woman by the day, which may be understood in Europe, by reckoning a shilling five fanams: piece-work, is chiefly practised with tank diggers, where the price depends on the distance to which the earth is removed.

Gardeners here come to labour at seven in the morning, go to dinner at twelve, return at three o'clock in the afternoon, and go home at sun-set.

21st.—Improvement here is to flood the land, so as to render it fit for rearing rice, which is esteemed the most valuable Crop.

22d.—There is nothing similar to the Eent and heath of Muir land here, to be paired and burned; but in clearing land for cultivation, the underwood and branches of trees being burned on the ground, afford a rich and valuable manure of vegetable alkali, which more than any other manure, promotes vegetation.

23d.—Those parts of the country, that have been depopulated by war or famine, are over-run with shrubs chiefly of the *genus mimosa*, and the great use made by the natives of the bark of trees for medicinal purposes, destroys most of the timber trees by barking them.

24th.—The price of provisions is perfectly arbitrary.

25th.—The roads are tolerable in the dry season; but as there are few made roads; in the wet season, they are difficult and dangerous.

26th.—The natives in general dwell in houses of clay, the dampness and lowness of which renders them very unwholesome abodes in the wet season.

27th.—There is the copy of a lease, for promoting a new Manufacture, in my last publication.

28th.—Manufactures, and commerce must ever be favorable to agriculture, in all countries.

29th.—It would require a dissertation to answer this question.

30th.—There are no societies amongst the Natives, independant of sacred shews, and pursuits of amusement.

31st.—The people are acute and intelligent as may be expected in a pure air and warm climate, where immemorial usage has established a very simple diet.

32d.—Let the husbandman reap the fruits of his labour and every suggestion of improvement will be attended to in this, as in the most cultivated state of society any where else.

33d.—Sheep die in my garden (where the soil is clay) during the rains ; and in case the liver is let fall on the ground, it breaks like a mass of clotted blood, whereas in the up-land gravelly ground, they keep healthy all the year.

34th.—Chiefly kali, and plants impregnated with mineral alkali.

35th.—No means have been used, as these lands are flooded in the wet season, the sheep are necessarily on the higher grounds.

36th.—See answer 34th.

37th.—These are waste lands, excepting where they are employed for making salt, in the dry season, which is effected by baling brackish water from the mouths of rivulets to evaporate and crystallize.

38th.—The greatest obstacle to improvement, is the monied interest being in the line of Renters, and dependants of Revenue Officers, whose authority enables them to lend money at a very high interest to the Ryot, and to oblige him to give them the crop, at the lowest rate of the season; which is kept up for months, and afterwards sold at a high price; whereby an artificial scarcity is in general produced, and frequently no grain allowed to be sold till what has thus been mortgaged is disposed of; and thus the Ryot is deprived of the advantage of his labour, and all incitement to industry checked. To remedy so great an evil may be difficult, but surely the Ryot should be supported in the means of cultivation, and the rents not demanded till the crop is realised.

TO DOCTOR FRANCIS DUNCAN,

I AM favored with your observations on the temperature of this climate under date the 1st instant, which being a subject of the greatest utility to the illustration and better ordering all physical matters, I consider of great importance to the success of the objects of this sort, I have endeavoured to recommend, for improving the welfare of this country.

Having published on the instant, whatever in the view of liberal enquiry, seemed worthy of notice, to this end, for nine years past; I last month distributed Queries of the Board of Agriculture lately instituted in London, as the most part of the Questions seemed well adapted to the investigation of the local situation of men employed in husbandry in all countries, but hitherto no answers have appeared from any quarter.

JAMES ANDERSON.

Fort St. George, October 27th, 1795.

Te

TO JAMES ANDERSON, Esq. P. G.

I ACKNOWLEDGE the receipt of your judicious letter of the 15th instant, and in reply thereto I beg leave to state, that Mâhâubhâurâtâ, consists of above one hundred thousand stanzas, and is divided into eighteen systems (viz.) 1st, Audè Pârvâm, 2d, Tâbhâu Pârvâm, 3d, Aurânyâ Pârvâm, 4th, Vèrâtâ Pârvâm, 5th, Odyôyâ Pârvâm, 6th, Bēēshma Pârvâm, 7th, Drônâ Pârvâm, 8th, Cârñâ Pârvâm, 9th, Sâlyâ Pârvâm, 10th, Tôushiptekâ Pârvâm, 11th, Strēē Pârvâm, 12th, Sâuntē Pârvâm, 13th, Aunōōsāsānika, Pârvâm, 14th, Aśvāmēdhēkâ, Pârvâm, 15th, Auśrāmāvosa Pârvâm, 16th, Mōūsālâ Pârvâm, 17th, Mâhâuprâstāunikâ, Pârvâm, and 18th, Svârgâurâhāñâ Pârvâm, add to these Hārēvāmsām, commonly called Bhāvēshyāt Pârvâm.

Bhāgāvāt, Gēēta, belongs to Bhēēshma Pârvâm, the sixth volume of Mâhâubhâurâtâ, and is an episode, containing the dialogues of Krīshnâ and Arjonâ, in 18 chapters or lectures, consisting of seven hundred stanzas, of which dialogues we have the translation made by the learned Charles Wilkins.

As for the circumstance regarding the valuable present made by the Chinese of Pättâ Kēētās, or silk worms, to Yōōdhēstērâ during his reign at Endrâprâstôm, I refer you to the second system entitled Sâbhâ Pârvâm, Chap. 86. where read the following verses.

Chēēna, Hōōnâh, Râshâh, Câuchâh,
Pârvâtâuntârâ, Vâusēnâh,
Aubârishōōr, dâsa Sâuhâśrâm,
Vēnēētâh, dētchōō, Vēśrōōtâh,
Câshnēēshâm, câmbâlāñchivâ.
Pättâ, Kēētâun, Stâdhivâchâ,

OR

Pättâjâm, Kēētâjâm, tâdhâ,

The Translation,

Chēēnâs, Hōōnâs, Râshâs, and Câuchâs,
Who lived on Mountain-Summits,
And who were famous,
With obedience brought (to Yōōdhēstērâ),
Ten Thousand-Caps, and Haircloths,
And also silk, and silk worms.

Note, that Chēēnâs, Hōōnâs, Râshâs, and Câuchâs, were four classes of people so styled amongst the Chinese, and that the number of ten thousand here figuratively signifies a great number.

Here

Here it is observable, that in the Sâmscritâ language, silk manufacture is proverbially called Chēenamfokam, that is the cloth of China. ex. gr. “Māhantā Chēenāmsōō Dōōkōōlakāunā” see Vērāntā pārvām, Chap. 66, verse 91:—also Cāulidāusā, one of the late inspired poets, says in one of his poems called Cómārāsāmbhāvām, thus “Chēenāmsōōkēh kālpetā cātōō-māulām; hence it is evident that silk has ever been cultivated in China.

T. MOOTIAH.

Nellore Fort, October 31st, 1795.

P. S. Having left all the manuscripts such as Aude Parvam. &c. in my Library at Madras, I have been obliged here to send for the Mahabarat, from some persons in the neighbouring villages, in order to quote the verses from it; in illustration of what I have stated in my letter of the 11th instant, and this is the reason why I have so long delayed writing my answer to you.

T. M.

TO JAMES ANDERSON, Esq. P. G.

I HAVE at last accomplished a commencement of what has long been the object of my wishes, rearing worms for sale by the natives on their own account, and from the pleasure I feel in the apparent probability of success, I am led to conclude it must give you much satisfaction, to see what has been done, which induces me to present you for your inspection two skains of silk, the first fruits of our undertaking, that owes its introduction to you, and promises general benefit.

The white silk is part of the produce of 3000 cacoons, which yielded $5\frac{1}{8}$ ounces of silk, that at 42 Pagodas, per Maund comes to 24 fanams 17 cash, from which after deducting 6 fanams, the price of the cacoons, also the expence of leaves and filature charges for winding, there remains, by my former calculations, a profit very flattering indeed, and I think I may without vanity say, that the quality of the silk is equal to any that has been manufactured on the Coast, not even making an allowance for the present season though some is to be made for the spinning, as the man I purchased the cacoons from, would not trust any person but himself, to ascertain the produce of them, notwithstanding it is to my recollection only the second or third time I have seen him at a reel.

BOSWALL PARKISON.

Vellout, November 3d, 1795.

To

TO JAMES ANDERSON, Esq. P. G.

CAPTAIN READ has now found it more convenient to carry on his speculations in Trippatore than at the new Petta, which was first proposed, therefore the old fort by the tank here is pitched upon for the purpose.

I am now very busy indeed, in erecting a boiling house, a distill house, and store rooms, likewise a mill on the West India plan to go with three cylinders, and I expect in the beginning of the ensuing year to have all at work, if it pleases God to let me enjoy health.

We can procure from our neighbours here about 5 taurs of canes to begin with, and labour being here not above half of what it is in Bombay, I am in hopes, that we will be enabled to proceed very well.

Besides the ground that is to be occupied with buildings, there is about 12 acres of very excellent soil, and a great command of water from the tank adjacent.

The objects of our cultivation is Mulberry, Sugar Cane, Cotton, Indigo, &c. and have now at work in the Fort from ten to 15 ploughs daily, to get it ready for planting.

Captain Read having never received any cotton feeds from Mr. Porcher, as you wrote me, has desired me to request the favor of you to try to get him a few cooly loads of it, if they are to be had by any means, and to let him know the expence that you may be at in procuring and sending them here, which he will readily discharge.

The mulberry cuttings I have just now recieved from you, I have planted one half perpendicular, and the other horizontal; as I was not sure which of the two is the right way; and looking over a great part of your publications, that Captain Read had by him, I could find no direction concerning that point of the business, and must beg the favor of you to let me know which is best, and how often they require to be watered, after they begin to shoot.

EYRE W. LYTE.

Trippatore Fort, November 3d, 1795.

TO JAMES ANDERSON, Esq. P. G.

I SHALL feel myself much obliged if you will indulge me with a cooly load of the Mauritius Cotton seed, some few plants raised

raised by Mr. Ord having produced Cotton very superior to that grown in this country; I shewed one or two pods to some respectable gours, who, at my desire, have agreed to cultivate it if seed can be procured.

I cannot doubt its success, and that it only needs time to produce a quantity sufficient to render us wholly independent of Ballagaut, as well as to make the quality of the Salim investment very superior to what it is at present.

T. B. HURDIS.

Trippatore, November 13th, 1795.

TO LIONEL PLACE, Esq.

Collector of the Jaghire,

THE bearer Golaum Modien, formerly Cutwall of Tripasore, in General Coote's time, and now an inhabitant there, where he occupies some nunja lands, having agreed with six other inhabitants, in a scheme of cultivating silk provided they can get sufficient punja lands, and the advance of some money, I recommend him and his associates to your notice and patronage.

Golaum Modien was brought to me by Mahomed Arif Mulna, who erected my Filature, and is the Cattannie first sent from Bengal, by Mr. Brown of Cossimbazar.

JAMES ANDERSON.

Fort St. George, November 18th, 1725.

TO EDWARD WATTS, Esq.

I SEND you 225 pound of Cotton feeds, collected last month at Pettaporem, which place produces by far the best cotton.

JOHN DENNIS.

November 17th, 1795.

TO MR. LYTE.

At Trippatore,

THE cuttings I sent you are of the large China Paper Mulberry, with a view to its introduction into the Barramah, and as the culture is no ways different from the culture of the sugar cane, excepting in their position; it is only necessary to say that we usually plant them, by thrusting the cutting half its length into the earth at an angle of 45 degrees with the surface of the ground, but I have no doubt of their thriving at this season if planted either horizontal, perpendicular, or obliquely.

Having

Having obtained from Mr. Porcher, 225 pounds of the best Mauritius Cotton Seeds, I shall despatch it for you this evening by four coolies, who, although the weather is unsettled will reach you in less than ten days; and as Mr. Hurdis has likewise applied to me for some, you will acquaint Captain Read, that I expect he will let him have as much as can be employed in the district, as I have no doubt of being able to procure more in case it is wanted.

JAMES ANDERSON.

Fort St. George, November 18th, 1795.

TO JAMES ANDERSON, Esq. P. G.

MR. GREGORY, at this place, was so infinitely obliging, as to supply me with a breed of the Cochineal Insects; and I was given to understand that by an act of administration, all concern of the culture of silk was to cease at the end of this present month, should this unfortunately be the case, permit me to offer you my sincere condolence on the probable operation of a measure so injurious to the well warranted prospect of the public.

I have been long in expectation of support and protection in my slender endeavours, but alas! to my great grief, I must now leave off the only comfort I had in life.

Mr. Heyne, at Samulcottah, at your desire, requested to be supplied with silk worms, which I promised as soon as possible, but after this late occurrence it will probably be needless.

CHARLES FRIMAN.

Masulipatam, November 13th, 1795.

TO LIEUTENANT CHARLES FRIMAN,

I AM favored with your letter of the 13th instant, and well satisfied your condolence for the fate of the silk manufacture is sincere, but an acknowledgement of the material assistance you have so steadily contributed to its promotion, although due from me, is no way an adequate return for your unwearied attention.

I will therefore, observe, that Mr. Gregory's orders must issue from the Revenue Board, on the idea, no doubt, of saving expences; but as you are the only person at Masulipatam who from first to last have maintained those insects, and are now in train to put them into other hands, such as Moubarick a Dowla,

E

Mr.

Mr. Heyne, and the people at Hydrabad, where they will be no charge to the Treasury, there is little doubt that a letter from you to the Right Honorable the Governor in Council, would effect every thing you wish in favor of your plantation.

I must likewise tell you that as the Souba has offered a reward of 20,000 Rupees to whoever first makes a skain of silk in his dominions, the person who supplies the breed will be entitled to his gratitude, as those reared at Beder by Captain Kirkpatrick must now be lost in consequence of the war; but accounts last night from Hydrabad inform, that the Prince Ally Jah having been deserted by his followers has turned faquir, and the country thus relieved from civil war by our detachment, the silk business will no doubt be resumed.

Having divided the grounds in my garden with a quick-set hedge of branches of the Wodier tree, on which the white lack was first found, I was agreeably surpris'd this morning to observe many parts of it, covered with caterpillars of the *Phalœna* of Muggadooty Silk, of which the Moormen's cummerbands are made; these insects are as large as a man's finger and of a grass green colour.

JAMES ANDERSON.

Fort St. George, November 20th, 1795.

TO T. B. HURDIS, Esq.

Collector of Trippatore,

I AM favored with your letter of the 13th instant, and have the pleasure to acquaint you that having despatched four cooly loads of the Mauritius Cotton Seeds to Mr. Lyte, at your residence, I have desired him to acquaint Captain Read of your application to me, that you may be supplied.

JAMES ANDERSON.

Fort St. George, November 20th, 1795.

TO DOCTOR JAMES ANDERSON, P. G.

Calcutta, November 10th, 1795.

I BEG to acknowledge and with much pleasure, the duly receiving your favour of the 4th ultimo, accompanied by one of your late publications.

In

In a former one, I understand, you have enlarged very fully on the growth of the Cochineal Insect, and being myself desirous, of trying what can be done under this management, shall be very thankful to you for it, as I shall for any other matter that may have occurred to you since then, and conducive to the success of either the plant or the Insect; and, with your leave, shall have much satisfaction, in making known to you the result of the practice recommended by you under this climate.

In the Pamphlet accompanying your former letter, I read with most agreeable surprize that you had encreased the Velocity of the Silk Reel; not less convinced of the advantages that must arise from it, than astonished that this should never have occurred to any one of us before; for it requires no small exertion on the part of those who turn the Reel, to keep it up to its proper pitch; and this contrivance will not only give great facility to the turner, but a great finish also in steadying and perfecting the evenness of the motion.

To effect this I imagine you will have done no more than take the handle out of the shaft of the Reel, placing it a few inches lower in a hole made through the upright of the frame, and then fixing a wheel upon that part of the handle gone through, on the inner-side, of three times the number of teeth, with that fixed to the shaft and so as to play into it.

But simple as this is, I will make no trial of it till I am favored with your return to this; when I pray you to let me know how, and in what manner you have contrived and executed this improvement, for I could wish in the event of my recommending it to the attention of the Board of Trade (and of which I have not the least doubt at present) to point to it as an improvement we are to consider ourselves wholly indebted to you for.

You make mention also in the same letter, of the Reel sent out to you lately by the Honorable the Court of Directors; two similar ones having been forwarded also to us here, but these Brass Wheels, can never stand the continuance and Velocity of the motion they are subject to, and although stronger than those formerly sent out with me, will not last out six months wear, without wanting to be entirely renewed.

Indeed it was the opinion of a very experienced Europe workman here, that they would not hold out six weeks; the expence of this brass work then alone, must set it aside, since by experience the wooden wheels are found in every respect equal to the brass, and their cost so little as scarce worth mentioning, and upon the whole more durable.

When Mr. Carbet was in this country, I gave him to take round to you on his return, a very perfect made Reel in all its parts, to serve as a model; but to the best of my recollection, I did not give him a double crossing machine with it, as we had been under the necessity of setting them aside altogether, on account of the threads continually breaking down with them, and which is owing to the weakness of staple in our silks, and I was not aware that yours would so far surpass ours in this respect, but I apprehend you will have had one affixed to the Reel lately sent you from home.

It is a contrivance that answers very well, but a simple ring of wood playing in a groove would answer the same end, to the full as well, and with proportionate saving in the first cost as with the brass wheels.

The wear and tear here is little or nothing; and if the value of the brass was not an inducement to stealing them away, they would last for years, so that although we do not use the double crossing machine at present, I shall be glad to know your contrivance in this department of our work; for I am not without hope of seeing them brought into play again, and with more success under the most desirable of all improvements, the giving strength of staple to the silk of this country.

JAMES FRUSHARD.

TO JAMES FRUSHARD, Esq.

Superintendent of the Silk Investment, Calcutta.

I AM favored with your letter of the 10th instant and doubt not, that the Cochineal will prosper in such hands as yours; I will therefore only advert to the mode of killing the insects, which may be better effected in an oven, in steam, or the selected rays of the sun, than in boiling water, which extracts a great deal of colouring matter.

Your notice of the improvement I have made on the Silk Reel, and crossing Machines being in fact an approval of the best authority, is so flattering to my ingenuity, that I am happy to acknowledge your perfect conception of the means I have taken to encrease the velocity of the first, as well as to discover a very adequate idea of the latter.

After telling you, therefore, that both the nuts are made of cast brass, a quarter of an inch in thickness, as strength is here wanted,

wanted, and the ring for the crossing machines, of lead, as weight is only necessary, you can be at no loss to construct them.

Without the crossing machines, your filature silk can be little better than the country wound, or what you professional men call fine waste, as the double crossing seems to me absolutely necessary to *organize* as the French term it, which if I am not mistaken may be understood in English, by the word compacted.

What led me to those improvements you have perhaps already accounted for, in the great strength of our silk, and hearing the cattanies constantly calling to the turners, *jilde, jilde*, or quick, quick, I determined they should be satisfied, and immediately built the reels of Triple Velocity, which have kept their ground here ever since.

The reel and double crossing machine you gave Mr. Corbet was sent me by his executor after his decease, and trying to construct crossing machines from that model, I soon found it so expensive and tedious, that I directed my carpenter to construct those now in use; a ring of lead, in a grooved segment of wood, with rollers in the groove for the ring to play on, which lead and all included, are easily made by any of the country workmen, and cost but a few fanams.

The Italian artists who constructed reels for his Sardinian Majesty, were so intent on a calculation of the number of turns that would occur before the thread returned to the same tract, that these improvements have escaped them, and this is consistent with the progress of every art and science but so far as they went we must allow them distinguished merit.

The story of Columbus and the Egg teaches us the difficulty of the most simple things that are not known, and we are taught by the great Bacon, that knowledge is power: you will not be surprized therefore, that your remark of steadying and perfecting the evenness of the motion, by greater Velocity, will enable you to resume the crossing machines, provided the iron stem of the handle of the reel, plays freely in a wooden handle, which is likewise a great means of promoting that end, as I found the iron work, morticed in the handle of your Bengal Reels, so that the turner had the skin peeled off the palms of his hands which obliged him to drive the reel and turn it by jerks.

I can only say, that if you will adopt in Bengal, the reels I have recommended, they will soon be productive of more benefit, than in my time they are likely be rendered here, even if no other than your annual silk should suit their structure.

JAMES ANDERSON.

Fort St. George, November 26th, 1795.

To

TO JAMES ANDERSON, Esq. P. G.

I HAVE just received from the bearers hereof four cooly loads of Cotton Seeds, for which I return my best thanks, and Captain Read desires his likewise; they never could have come in a better time as we have rains now every day, and I am all ready for putting them in the ground, which I shall begin immediately.

I have now besides the mulberry cuttings you were kind enough to send me, about 800 cuttings planted, and a great many of them giving out young buds; so that I am in hopes, that in a short time we shall be able to find subsistence for a few worms, as we are going on planting every day, and have about four acres of land already prepared for that purpose.

I am likewise ready for planting some sugar cane :—I expect to night from Mr. M'Kay, at Arcot, 10 bullock loads of the Jamaica Cane ; and I expect as soon as the farmers about here begin to cut, to plant a great deal more.

The desperate weather on the 29th of last month, has put us back greatly in our buildings, but I am in hopes it is all for the better, as all the tanks are quite full of water.

Captain Read is going to Madras in a few days, and I believe he means to bring up some silk worm eggs with him, I have by chance found a Mussulman here who says that he understands the care of the worms, and the spinning of the raw silk.

I can give you very little account of the Cochineal, any more than that I keep up the breed by shifting them from one fence to another until we may establish a new plantation for them; as the one I mentioned in a former letter has been all taken out again, Captain Read thinking the ground too good for that purpose, and it is now planted with mulberry.

But I have since planted all round our lands with the nopal, at seven feet distance from one another, and as soon as they have taken good root, I shall begin to put insects on them.

I shall send Mr. Hurdis one cooly load of the cotton seeds this evening, and hope you will excuse this rough sketch, as the hurry of business will not allow me much time for writing.

EYRE W. LYTE.

To

TO THE RIGHT HONORABLE LORD HOBART,
GOVERNOR IN COUNCIL, &c. &c. &c.
MY LORD,

IT is with the greatest pleasure I now forward pieces of Cassimere cloth and Flannel, dyed with the cochineal reared here, which in brightness and colour equal the best scarlets; and having thus established the goodness of the dye, I have also much pleasure in acquainting your Lordship, that in comparing it with the Granafina, I have had familiar success, in finding that it has more colouring matter than the Sylvester cochineal, imported into Europe from Mexico, is said to possess.

What I first stated as its value, was from the only book I had at the time that spoke to that point, Thierry de Menouville; but being anxious to ascertain this by experiment, I since learned from the latest publication here on dying, that four times the quantity of Sylvester, to that of Granafina was required; the flannel was dyed in this proportion, but a part of the colouring matter remained in the water.

That our cochineal is much more valuable the accompanying specimens will shew, No. 1, being dyed with the best Granafina to be purchased here, and for which I paid one Pagoda an ounce, and No. 2, dyed with that produced here equal in quantity to three times that of the other—in every other respect the same additions made, similar vessels used, and equal time in the process, No. 2, both in colour and brightness is superior to No. 1, and when the greater specific gravity of our cochineal is also taken into account, not having had time to be equally dry with the other, and that the attention I would now use for the preparation of the Insect and separation of their coverings, &c. had not been paid, there can be little difficulty in saying, from the experiments I have made, that it is at half the value of the Granafina, and that its superior durability of colour may make it only one third less, the price that Thierry de Menouville asserts it always bears in Mexico, and which I am also told is its value in Europe.

In my first letter to your Lordship I recommended that the insects should be killed in boiling water, but this I have found improper for two reasons, first that a great deal of colouring matter is lost, and secondly that the coverings of the insects from being wetted cannot afterwards be separated; I next tried suspension in steam and exposure to heat in an oven, but had the same reason for disapproving of the steam, that the coverings were wetted, and in regard to the oven, the heat required was very apt to burn those

those at the bottom of the vessel, or nearest the fire; but all objections I soon after found obviated by putting them in an earthen vessel placed over another in which water is boiled, with the precaution of having a sheet of paper or piece of cloth under the insect, as the greatest heat the boiling water could give, caused no detriment; nor any danger in continuing it as long and as often as might be thought necessary.

As the insects became shrivelled and hard, I rubbed them gently between my hands so as to detach the coverings, and having them winnowed as the natives do their rice to separate the husk, all impurities were got rid of. The specimen which I have now the honor of enclosing was treated in this manner, and is of the best quality I have been able to produce; it is rather small in quantity from my having had a great deal powdered for the experiments I have for these several days past been making for the dye which I shall endeavour to make up for as soon as the ground dries and the nopal plants get better rooted.

In my last I promised your Lordship an account of the best manner of what is termed sowing them, and the simplest and easiest I have found best; viz.—taking the thorn of the plant and fixing thereby the largest females by means of their covering, without injuring or wounding them to the leaves of the plants, in the least exposed situations, and in number according to the luxuriance of the plants; little attention further than fences and no randall's are requisite, and they have encreased even after the exposure to the late violent storm of the 29th ult. of wind and rain; the difficulty I have is to clear the plants entirely of them, that they have once multiplied on, which is absolutely necessary after every generation, or at farthest every second, to preserve the plants and give them time to recruit; for this purpose after picking off all the insects I am obliged to have every part of the plants washed with wet rags tied to the end of sticks, and to examine them 8 or 10 days afterwards, lest any young insect may have escaped; and in this way plantations once established, may answer for a long time (one third or fourth only having insects at the same period) that would otherwise soon be destroyed.

Having had letters from gentlemen on first receiving the insect that I had not been sufficiently explicit in distinguishing the male and female, it may be proper to observe, the male is a small fly, that flutters about for a few days, afterwards dies, and is generally blown off the plant, while the female remains fixed from a day or two after her first appearance to the time she is picked off, or allowed to remain for the issue of the young, after which she
also

also dies, and can at no time be detached without death being the result: it is this that makes it of such consequence, when a plant is to be sown, to take the largest females on the first appearance of young.

I have thus, my Lord, stated I hope sufficient to shew that this insect is valuable, easily reared, and worthy of every encouragement to bring it into general culture.

I am,

My Lord, &c.

ANDREW BERRY,

Superintendent of the Hon. Company's Nopalry.

Fort St. George, 8th December, 1795.

TO DOCTOR ANDERSON, P. G.

I HAVE sent two bags of cotton-seed, weighing 125 pounds, for Captain Read, and shall be very happy to give him more, should he want them.—The great difficulty, and expence in the Cotton business, is the cleaning, which I have endeavoured to reduce as much as possible, and shall at any time be happy to shew any person, engaged in the concern, the method which I follow.

I am much obliged to you for letting my people stay at the Garden at Mannalou, to learn the management of the Cochineal Insect, and am happy to inform you that they report themselves equal to the process; and as many of the plants at Mootoochoor, and Pummel are fit to receive the insect, I shall thank you for a supply for each place.

The Mulberry Plantation, in which I am deeply concerned, has suffered in common with other places by the late storm; and it is with regret I observe, that Government, in a Letter to the Board of Revenue (Extract of which they sent to the Collector, who favoured Messrs. Woolf and Sewell with a copy, on the 24th ultimo, in reply to an address from those gentlemen to the Revenue Board, dated the 10th August) seem to doubt the sincerity of our intentions, after we have expended more than the amount of eight years value of the farm which we hold—and this will ever be the case whilst they attend to partial representation of circumstances, which ought to be only under their own observation.

I believe the Mauritius Cotton-seed, is better than the common gram for cattle;—I have given it in small quantities, with success, to fatten old horses.

WILLIAM WEBB.

Madras, December 10th, 1795.

To

TO DOCTOR ANDERSON, P. G.

MANY thanks for your friendly aid, in procuring for me all the requisites to our improvements in the west.

Send on the cotton seed with the silk reel in charge of Mahomed Arif, whom I have engaged to-day, and given a month's pay in advance.

The cotton manager is gone to consult his wife about settling in the Baramahl; could I get one who understands the Indigo Business, I should be quite set up.

ALEXANDER READ.

Madras, December 10th, 1795.

TO JAMES ANDERSON, Esq, P. G.

IT is some time since I was favored with the Pamphlet, you were good enough to send me, relative to the importation of the Cochineal Insect, from South America.

I perused it with glowing satisfaction, considering the object of it, not only as one that with due care and attention, may hereafter prove a great and certain source of wealth to the British Nation, but as one which cannot but reflect much honor on the person, whose zeal and disinterested exertions for the public welfare, first suggested the plan, and pointed out the mode by which it would be best executed.

The weather here, has been the opposite of what you have experienced in the Carnatic; which by all public and private accounts, has exhibited a most calamitous, stormy, and disastrous scene.

In the Tinnevely Province, at the same time that we have had an unusually abundant fall of rain, the weather has proved uncommonly moderate, attended with hardly any thunder or lightning, and no wind that exceeded a gentle breeze.

All the tanks in the country are full; and the crop, both of dry grain and paddy, promises to be very luxuriant. — During the eight years, I have been resident here, no season has passed, the complexion of which proved altogether so favorable as this.

ALEX. WATSON.

Palamcottah, December 12, 1795.

